EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **February 2000**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**				R-1 ITEM NOMENCLATURE Advanced Combat System Technology /0603382N					
COST ($ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		**6.437**	**6.790**	**6.943**	**6.989**	**6.964**	**7.024**	**7.165**	**CONT.**	**CONT.**
Advanced Combat System Technology/K0324		**6.437**	**6.790**	**6.943**	**6.989**	**6.964**	**7.024**	**7.165**	**CONT.**	**CONT.**
Quantity of RDT&E Articles	**Not Applicable**									

A. (U) Mission Description and Budget Item Justification

This line item funds studies and experiments which will be conducted in distributed computer architecture, radar technology, and Tactical Informational Management Concepts to mature them to transition candidates for introduction into the AEGIS Weapon System. This program will take a disciplined systems engineering approach to find how these advances can be integrated into the AEGIS system and subsequent combat systems, and to plan combat system baseline upgrade schedules. Fully Distributed Computing Architecture is the first advanced development effort, leveraging the joint AEGIS/Defense Advanced Research Projects Agency (DARPA) High Performance Distributive Computing (Hiper-D) technology effort. It implements the results of distributed processing advances to replace the current AEGIS Combat System architecture with an open, distributed architecture. Radar studies are also being conducted to identify state-of-the-art technology options for the next generation radar. Complex Tactical Information Management of the flow and display of tactical information through the "detect-control-engage" process to better support the operator/decision maker will be a significant priority of this task. These advanced technologies are candidate systems for future baseline upgrades.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY99 ACCOMPLISHMENTS:
- (U) ($2.000) Conducted studies concerning the feasibility of applying Visualization Architecture and Technology (VAT) concepts to shipboard use.
- (U) ($1.008) Continued system engineering experiments with currently emerging Commercial Off-The-Shelf (COTS) and DARPA computer technologies to assess improvements in upgrades against previously identified shortfalls. Provided feedback on existing shortfalls for future enhancements. Conducted work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) ($1.317) Conducted an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on initial QoS (Quality of Service) functionality in the middleware domain. Demonstrated an initial integrated set of common engineering services for the information infrastructure, including the addition of another warfighting or other shipboard information/control system. Also demonstrated initial middleware capabilities within the Common C&D (Command & Decision) functional areas that support object-oriented computer program architectures.
- (U) ($1.000) Initiated risk reduction experiments focused on middleware issues associated with object-oriented computer program architectures with an initial target of Common C&D capability for AEGIS combat systems. Assessed maturity and transition potential of available or emerging technologies into AEGIS Baseline development efforts on Baseline 6 Phase III and 7 Phase I.

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- (U) ($1.112) Enhanced AEGIS Weapon System architecture and performance models using prototype modeling tools, multi-sensor coordination, and advanced tactical information management concepts. Developed and validated enhanced certification techniques that are applicable to the enhanced computing architecture prototyped in FY98.

(U) FY00 PLAN:
- (U) ($1.212) Continue system engineering experiments with currently emerging COTS/DARPA computer technologies to assess improvements in upgrades against previously identified shortfalls. Provide feedback on any existing shortfalls for future enhancements. Work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) ($3.380) Conduct an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on second phase QoS functionality in the middleware domain. Assess and validate the available certification techniques applicable within the Common CDS functional areas that support object-oriented computer program architectures.
- (U) ($1.200) Initiate transition efforts of lessons learned in the FY99 middleware risk reduction experiments targeted at the Common CDS capability for AEGIS combat systems. Work with the Baseline development teams to identify remaining or emerging issues associated with transition to Baseline 6 Phase III and Baseline 7 Phase I for middleware capabilities.
- (U) ($0.998) Validate the performance modeling tools against the existing prototype capabilities in the computing testbed.
- (U) Note: $0.065 of the efforts described represent the portion of extramural program that is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) FY01 PLAN:
- (U) ($1.295) Continue system engineering experiments with currently emerging COTS/DARPA computer technologies to assess improvements in upgrades against previously identified shortfalls. Provide feedback on any existing shortfalls for future enhancements. Work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) ($3.448) Conduct an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on second phase QoS functionality in the middleware domain. Assess and validate the available certification techniques applicable within the Common CDS functional areas that support object-oriented computer program architectures.
- (U) ($1.200) Continue integration of lessons learned in the FY00 middleware risk reduction experiments targeted at the Common CDS capability for AEGIS combat systems. Work with the Baseline development teams to identify remaining or emerging issues associated with transition to Baseline 6 Phase III and Baseline 7 Phase I for middleware capabilities.
- (U) ($1.000) Continue validation of the performance modeling tools against the existing prototype capabilities in the computing testbed.

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RDT&E, N / BA 4	**ADV COMBAT SYS TECH/0603382N**	Advanced Combat System Technology /0603382N

Program Change Summary:

	FY 1999	FY 2000	FY 2001
FY 2000 PRES Budget Submit	6.634	6.828	12.043
Appropriated Value:	6.653	6.828	
Adjustment to FY 1999/2000 Appropriated Value/ FY2000 President's Budget:	-0.216	-0.038	-5.100
FY 2001 PRES Budget Submit:	6.437	6.790	6.943

Funding: FY 1999 funding decrease is due to SBIR reduction ($-0.154), and minor pricing adjustments ($-0.062). FY2000 funding decrease is due to minor pricing adjustments ($-0.038). FY 2001 change is due to a decrease for shifted Navy priorities ($-1.500), level of effort correction ($-3.559), NWCF Rate increase ($+0.046), and minor pricing adjustments ($-0.087).

Schedule: Not applicable.

Technical: Not applicable.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
RDT&E, N / 1319 / BA 4 PE0604307	175.562	256.120	179.684	194.015	130.676	107.796	82.409	CONT.	CONT.

C. Acquisition Strategy: Risk reduction efforts are lead by NSWC/DD, the AEGIS Combat System Lifetime Support Engineering Agent (LSEA). Results are transitioned to industry for cost and risk mitigation in the production of AEGIS Combat Systems.

D. Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2000**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**			PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**			PROJECT NAME AND NUMBER: Advanced Combat System Technology /K0324						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPFF	APL, Baltimore, MD	5.850	1.729	11/98	1.570	11/99	1.758	11/00	CONT.	CONT.	
Systems Engineering	WR	NSWC, Dahlgren,VA	8.210	1.695	12/98	4.002	12/99	3.874	12/00	CONT.	CONT.	
Systems Engineering	WR	NAWCAD, St. Inigoes, MD	0.000	2.000	03/99					CONT.	CONT.	
Subtotal Product Development			14.060	5.424		5.572		5.632		CONT.	CONT.	0.000
Remarks:												
Support	WR	Miscellaneous	0.150	0.255	11/98	0.255	11/99	0.275	11/00	CONT.	CONT.	
Subtotal Support			0.150	0.255		0.255		0.275		CONT.	CONT.	
Remarks:												
Test & Evaluation	WR	Miscellaneous	0.000	0.315	11/98	0.325	11/99	0.381	11/00	CONT.	CONT.	
Subtotal T&E			0.000	0.315		0.325		0.381		CONT.	CONT.	
Remarks:												
Program Management Support	WR	Miscellaneous	0.000	0.443	11/98	0.638	11/99	0.655	11/00	CONT.	CONT.	
Subtotal Management			0.000	0.443		0.638		0.655		CONT.	CONT.	
Remarks:												
Total Cost			14.210	6.437		6.790		6.943		CONT.	CONT.	